Int J Clin Exp Med 2019;12(12):13298-13304
www.ijcem.com /ISSN:1940-5901/IJCEM0100545

Original Article

Effect of comprehensive nursing on quality of life and swallowing function of stroke patients and analysis of related risk factors

Xiuyan Sang[1], Dongmei Guo[2], Huayun Huang[3]

[1]Tai'an City Central Hospital Department of Aging, Tai'an, Shandong, China; Departments of [2]Neurology, [3]Neurosurgery, Tai'an Central Hospital, Tai'an, Shandong, China

Received August 4, 2019; Accepted October 8, 2019; Epub December 15, 2019; Published December 30, 2019

Abstract: Objective: This study aimed to analyze the effect of different nursing models on the quality of life and swallowing function of stroke patients in China, and to provide relevant reference for rehabilitation nursing of stroke patients. Methods: This study was a clinical randomized controlled trial. The stroke patients from January 2017 to January 2019 were randomly divided into the experimental group and the control group. The experimental group was given comprehensive nursing, while the control group was given conventional nursing. The recovery of swallowing function, nerve function, cognitive function and quality of life were compared between the two groups. Results: A total of 3421 patients were examined, 55.31% of them were 60-70 years old, and 59% of them were female. Hypertension, diabetes, cardiac disease, hyperlipidemia and other diseases are still risk factors of stroke. After comprehensive nursing, the improvement of swallowing function in the experimental group was better than that in the control group ($P < 0.05$). The Chinese stroke scale (CSS) score of nerve function recovery in the experimental group was lower than that in the control group ($P < 0.05$). The recovery of limb function in the experimental group was better than that in the control group ($P < 0.05$). The Activities of daily living (ADL) score of life quality in the experimental group was better than that in the control group ($P < 0.05$). The moderate-to-severe depression rate in the experimental group was lower than that in the control group ($P < 0.05$). Conclusion: The results of this study indicate that female, age of 60-70 years old, and complicating hypertension, diabetes, cardiac disease, hyperlipidemia and other diseases are the risk factors of stroke. The application of comprehensive nursing during hospitalization is conducive to the recovery of swallowing function, the improvement of limb movement disorders, the nerve repair, the decreased incidence of post-stroke depression and the improvement of life quality.

Keywords: Stroke, comprehensive nursing, nerve repair, limb movement, quality of life

Introduction

Stroke is one of the common cerebrovascular diseases in middle-aged and elderly patients. Its incidence rate is as high as 23.18% [1]. With the development of medicine, the mortality rate of stroke patients has decreased, but its disability rate has gradually increased to 53.3% [2]. 27.55% of patients cannot live and work normally after a stroke, which brings a heavy burden to the nursing staff and society, which seriously affects the quality of life of patients [3]. Related studies have shown that timely comprehensive care after stroke patients can effectively improve the prognosis of patients.

Albieri, V has reported that the central nervous system has certain plasticity and reorganization in function and structure [4]. Therefore, early comprehensive nursing intervention about psychology and life can effectively promote the functional recovery of neurons. Umemura, T has pointed out that early nursing after stroke can improve the quality of life and reduce the burden of caregivers for stroke patients [5]. Although a few reports suggested that the comprehensive nursing can improve the prognosis of patients [6, 7], there are no related studies to systematically evaluate the swallowing function, limb movement function and prognosis of stroke patients [8], and studies on comprehensive nursing in multiple centers [9].

This study aimed to analyze the effect of different nursing models on the quality of life and swallowing function of stroke patients in China,

and to provide relevant reference for rehabilitation nursing of stroke patients.

Materials and methods

Patient population

The patients with initial stroke were included from January 2017 to January 2019 in Tai'an Central Hospital. All patients met the following inclusion and exclusion criteria. Inclusion criteria: 1) Patients aged 18 years and older. 2) Patients who meet the international diagnostic criteria for stroke [10]. 3) Patients diagnosed as stroke by neurologist through imaging examination. 4) Patients with initial stroke. 5) Patients who agreed to participate in this study and signed the informed consent. Exclusion criteria: 1) Patients with severe liver and kidney dysfunction. 2) Patients with immune and psychiatric diseases. 3) Patients who refused to participate in this study and signed informed consent. This study was approved by the ethics committee of our hospital.

Blind method

All patients were ranked by random number table, and randomly divided into control group and experimental group. All patients did not know the type of care they were performing.

Nursing methods

Control group: The patients in control group were given conventional nursing. The control group underwent routine neurological care, including health education for routine stroke knowledge, diet care, general safety care, etc.

Observation group: The patients in observation group were given comprehensive nursing, including: admission assessment, psychological nursing, swallowing function nursing, posture nursing. The specific nursing model is introduced as follows.

Admission assessment: At the time of admission, patient's condition and psychological state were assessed, and individualized comprehensive nursing treatment protocol was formulated.

Psychological nursing: The nursing staff actively explained the related knowledge and considerations of stroke to patients and their families, actively answered the patients' questions, eliminated the unhealthy psychological state of patients such as tension and anxiety, and alleviated their psychological burden.

Swallowing function nursing: In the conscious state of the patient, the soft palate and tongue base of patient were stimulated with a frozen cotton swab dipped in water to stimulate patient's vomiting reflex. When the patients were unable to swallow, the fingers were used to rub against the skin between patient's thyroid cartilage and mandible to promote the movement of the mandible and tongue, thus causing swallowing movement. When the patient had excessive salivation, the salivary glands were stimulated with a frozen cotton swab for 10 minutes each time. In addition, the nursing staff selected soft and digestible food for the patients and let them control their eating time and clean their mouth before and after eating.

Posture nursing: According to patient's condition, patient's posture was changed regularly to avoid limb compression. When lying in bed, the patients' limbs and joints were massaged, and patients were instructed to raise their hands, bend their legs, and abduct to promote blood circulation of limbs and accelerate the recovery of limb strength. When the patient's condition was gradually improved, the nursing staff accompanied the patient out of bed, but avoided large-scale strenuous activities.

Outcome measures

Water Drinking Test was used to evaluate the swallowing function recovery of patients [11] (operation as follows: a cup of 30 mL lukewarm boiled water was prepared; Class I: patients can drink it once without coughing; Class II: patients can drink it twice without coughing; Class III: patients can drink it once with coughing; Class IV: patients can drink it with twice or more coughing; Class V: patients are difficult to drink it and coughed many times).

Before and 3 months after the intervention, the Chinese Stroke Scale (CSS) score and the FMA score were used to evaluate the limb movement function of patients [12]. The ADL was used to evaluate the quality of life of patients [13] (The total score is 100 points. The higher the score is, the stronger the self-care ability of patients is. More than 60 points: patients can basically take care of themselves; 40-59 points: patients need help; 20-39 points: patients

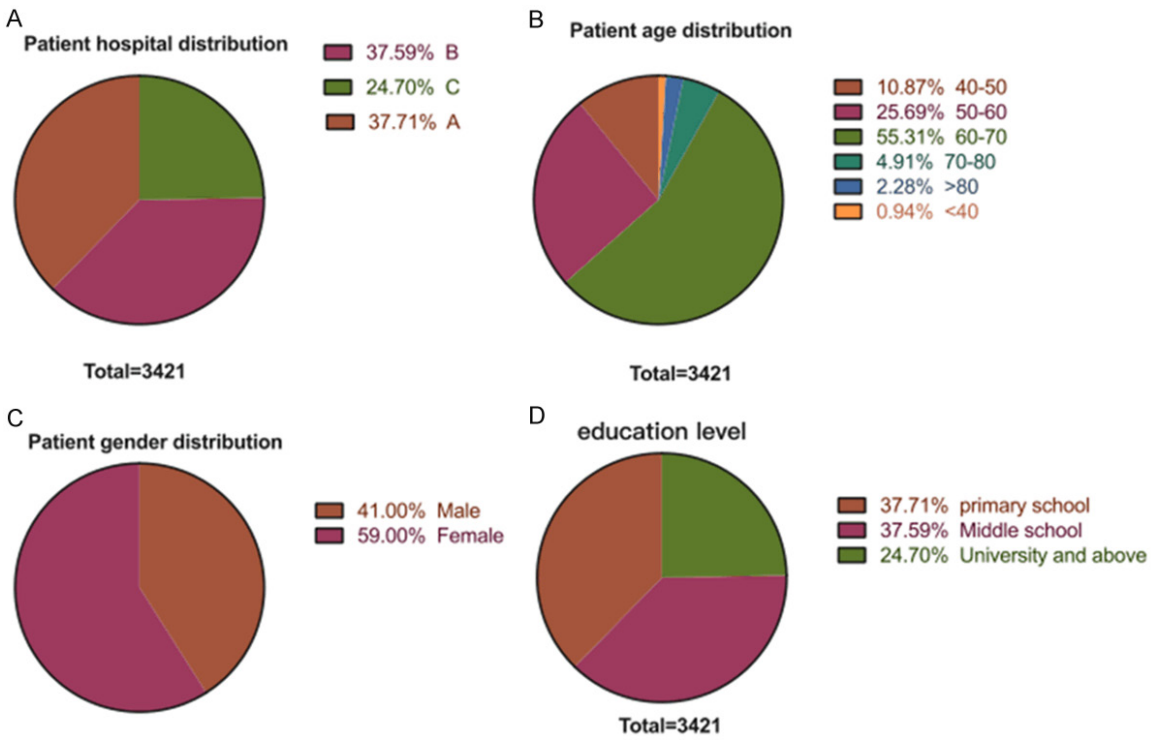

Figure 1. A. A hospital included 1,290 patients, B hospitals included 1,286 patients, and C hospitals included 1,450 patients, and D hospital included 845 patients. B. The peak age of stroke was 60-70 years old. C. Stroke is more common in female. D. Stroke has nothing to do with education.

need greater help; less than 20 points: patients can't take care of themselves at all). HAMD was used to evaluate the depression of patients [11] (Total score less than 7 points: normal; total score of 8-17 points: mild depression; total score of 18-24 points: moderate depression; total score more than 25 points: severe depression).

Statistical methods

The data in this study were processed by statistical software SPSS 20.0. The measurement data were represented by mean ± standard deviation (x ± sd) and analyzed by t-test. The enumeration data were represented by % and analyzed by χ^2 test. $P < 0.05$ indicated the difference is statistically significant.

Results

Comparison of general baseline data between two groups

A total of 3421 patients were enrolled in this study. They were randomly divided into experimental group with 1711 patients and control group with 1710 patients according to the random number table method. The demographic analysis of the patients showed that 59.87% of the patients were male, 40.13% were female, the peak age was 60-70 years old, 90% of the patients were married, and 62% of the patients had no university education (**Figure 1A-D** and **Table 1**).

Risk factors analysis of stroke

In stroke patients, the morbidity of risk factors from high to low was as follows: hypertension, diabetes, cardiac disease, and hyperlipidemia (**Figure 2** and **Table 2**).

Comparison of swallowing function recovery

Before treatment, 886 patients in the experimental group had dysphagia, while 873 patients in the control group had dysphagia. The statistical analysis showed that there was no remarkable difference between the two groups (Grade V) before treatment. After treatment, the swallowing function of the experimental group was better than that of the control group (**Figure 3**).

Table 1. Respondent baseline data

Variable	Experimental group	Control group	P
Sex			
Male	701	702	0.57
Female	1010	1008	0.66
Age	72.3 ± 2.4	74.1 ± 1.8	0.76
BMI	26.1 ± 3.2	25.2 ± 2.9	0.67
Married	1532	1537	0.65
Smoking	1179	1169	0.75
Drinking	894	871	0.66
Education level			
University and above	326	271	0.78
Middle school	1077	1050	0.88
Primary school	308	370	0.58
Comorbidity			
Diabetes	921	975	0.57
Coronary heart disease	893	886	0.77
Hyperlipidemia	1092	975	0.71
Hypertension	1134	1086	0.69
TIA	672	665	0.77
Hard to swallow	886	873	0.79

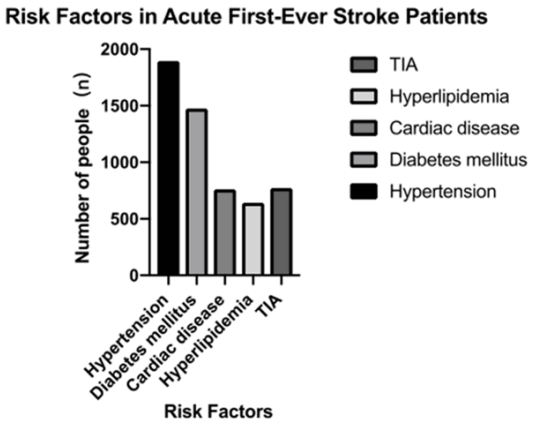

Figure 2. Hypertension, diabetes, cardiac disease, hyperlipidemia are risk factors of stroke.

Evaluation of nerve function

There was no remarkable difference in nerve function CSS score between the two groups before treatment. After treatment, the CSS score of the experimental group was lower than that of the control group (**Figure 4**).

Evaluation of movement function

There was no remarkable difference in movement function FMA score between the two groups before treatment. After treatment, the FMA score of the experimental group was higher than that of the control group (**Figure 5**).

Evaluation of quality of life

There was no remarkable difference in ADL score between the two groups before treatment. After treatment, the ADL score of the experimental group was higher than that of the control group (**Figure 6**).

Evaluation of anxiety

After treatment, the HAMD score of the experimental group was higher than that of the control group, and the number of patients with moderate and severe depression in the experimental group was less than that in the control group (**Figure 7**).

Discussion

This study analyzed the risk factors and demographic factors of the initial stroke in China. The epidemiological investigation of stroke showed that the incidence of stroke in males was higher than that in females [14], which was consistent with the results of this study. The peak age of the disease is between 60 and 70 years old in this study, which was different from previous epidemiological studies. The reason might be that only the statistics of the patients with first stroke was carried out, and the patients with recurrent stroke were not included in this study.

The statistical range was small, which might cause the differences. In this study, the common risk factors of stroke were further analyzed. The results showed that hypertension was the most important risk factor of stroke, followed by diabetes, hyperlipidemia and coronary heart disease, which was similar to the study of Buzzi A, Christensen H [15, 16].

Esenwa C has reported in a small-scale study that comprehensive nursing could improve the prognosis of stroke patients [17], which was similar to the results of this study. In the study of Gomez-Batiste, X., it was found that the earlier the rehabilitation nursing intervention is, the better the improvement of swallowing function is [18], which was similar to the results of this study. Langer, C. S. [19] has put forward the plasticity and reorganization theory of brain

Table 2. Regression analysis of risk factors for stroke

Variable	Stroke OR (95% CI)
Age	1.21 (1.01-1.32)
p Value	0.031
Sex	
Male	0.77 (0.33-1.92)
Female	1
p Value	0.271
Marital status	
Married	1.17 (1.00-1.62)
Unmarried	1
p Value	0.47
BMI	
p Value	0.053
Smoking	
Yes	1.33 (0.98-1.57)
No	1
p Value	0.01
Drinking	
Yes	1.33 (0.98-1.57)
No	1
p Value	0.053
Exercise	
Yes	1.03 (0.69-1.32)
No	1
p Value	0.061
Education level	
University and above	3.98 (1.62-6.21)
Middle school	2.68 (1.90-7.66)
Primary school	3.84 (1.66-7.90)
p Value	0.011
Diabetes	
Yes	1.76 (0.99-1.29)
No	1
p Value	0.044
Coronary heart disease	
Yes	1.06 (0.05-1.29)
No	1
p Value	0.013
Hyperlipidemia	
Yes	1.55 (0.4-1.29)
No	1
p Value	0.044
Hypertension	
Yes	0.58 (0.09-7.20)
No	1
p Value	0.009
TIA	
Yes	0.38 (0.09-7.20)
No	1
p Value	0.059

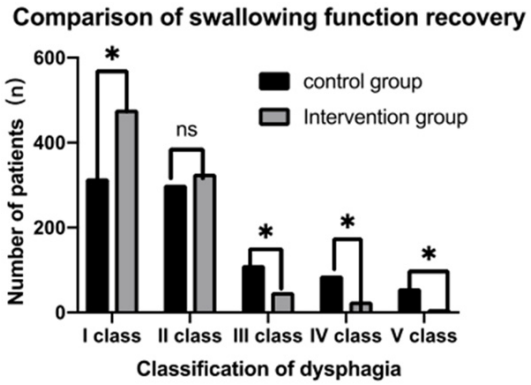

Figure 3. There was no remarkable difference between the two groups (Grade V) before treatment. After treatment, the swallowing function of the experimental group was better than that of the control group. *P < 0.05.

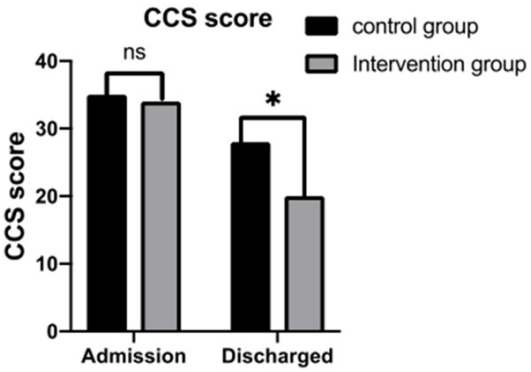

Figure 4. There was no remarkable difference in nerve function CSS score between the two groups before treatment. After treatment, the CSS score of the experimental group was lower than that of the control group. *P < 0.05.

function, which was the basis of comprehensive nursing. After stroke, the damaged nervous system could be repaired by methods of axonal sprouting, latent pathway activation and peripheral tissue compensation, etc. Based on the above principles, early comprehensive nursing could promptly input the instructions of normal movement function into the brain to promote the repair of brain injury [20], the development of nerve cells around the lesions into compensatory blockage [21], and the recovery of limb movement [22]. The results of this study showed that after comprehensive nursing intervention, the CSS score of nerve function recovery in the observation group was lower than that in the control group. Wheatley L. found that comprehensive nursing could improve limb movement function of patients in

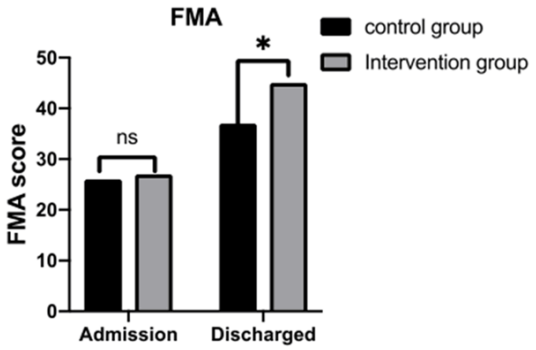

Figure 5. There was no remarkable difference in movement function FMA score between the two groups before treatment. After treatment, the FMA score of the experimental group was higher than that of the control group. *P < 0.05.

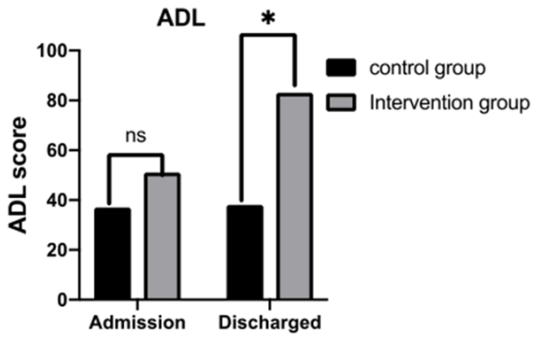

Figure 6. There was no remarkable difference in ADL score between the two groups before treatment. After treatment, the ADL score of the experimental group was higher than that of the control group. *P < 0.05.

a single-center randomized controlled study [23]. The results of this study suggested that comprehensive nursing could obviously improve limb movement disorders compared with conventional nursing, which was consistent with the above findings. Early comprehensive nursing intervention could reduce the occurrence of complications such as muscle atrophy and joint contracture deformity, promote the early recovery of patients, and improve the quality of life in the later period [24, 25]. Early psychological intervention could improve the anxiety of patients after stroke. Santos, A. M. pointed out that early psychological intervention could make patients further understand the related content of stroke, have a correct understanding of the disease, and actively cooperate with doctors, and could improve the prognosis in the related clinical randomized control study [26]. In the studies of Gunderman R and Delavaran H [27, 28], it was suggested that comprehensive nursing could improve the prognostic life quality of early stroke patients. The results of this study showed that comprehensive nursing could improve ADL score of patients, which was consistent with the above findings.

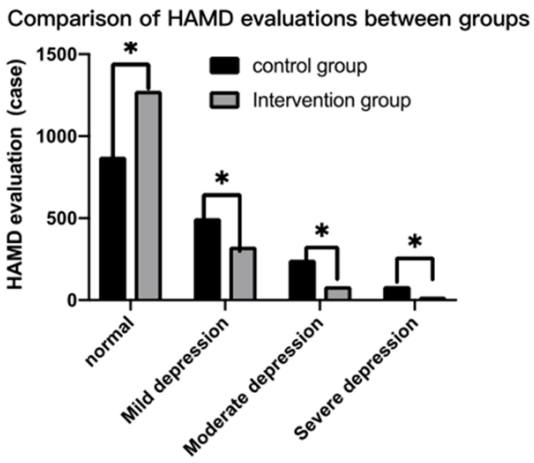

Figure 7. After treatment, the HAMD score of the experimental group was higher than that of the control group, and the number of patients with moderate and severe depression in the experimental group was less than that in the control group. *P < 0.05.

There are some limitations in this paper. First, it was not enough to reflect the results of comprehensive nursing for all stroke patients in China. Second, this is a randomized controlled clinical study. Although data collection is as comprehensive as possible, some data may be lost in the course of investigation. Further large-scale multi-center prospective cohort study is needed to further analyze the role of comprehensive nursing in the prognosis of stroke.

Disclosure of conflict of interest

None.

Address correspondence to: Huayun Huang, Department of Neurosurgery, Tai'an Central Hospital, No. 29, Longtan Road, Taishan District, Tai'an 271000, Shandong, China. Tel: +86-0538-8224161; E-mail: huanghhy61@163.com

References

[1] Driessen D, Stuhldreier F, Frank A, Stark H, Wesselborg S, Stork B and Muller TJJ. Novel meriolin derivatives as rapid apoptosis inducers. Bioorg Med Chem 2019; 27: 3463-3468.

[2] Hosaka M, Arai I, Ishiura Y, Ito T, Seki Y, Naito T, Masuzawa Y, Nakayama T and Motoo Y. Efficacy of daikenchuto, a traditional Japanese Kam-

po medicine, for postoperative intestinal dysfunction in patients with gastrointestinal cancers: meta-analysis. Int J Clin Oncol 2019; 4: 1385-1396.
[3] Stork B and Loeb S. The urology care foundation - trusted online resources in an era of misinformation. Nat Rev Urol 2019; 16: 637-638.
[4] Albieri V, Olsen TS and Andersen KK. Risk of stroke in migraineurs using triptans. associations with age, sex, stroke severity and subtype. EBioMedicine 2016; 6: 199-205.
[5] Umemura T, Ohta H, Yokota A, Yarimizu S and Nishizawa S. Urinary retention associated with stroke. J UOEH 2016; 38: 263-269.
[6] Reddy A, Sessums L, Gupta R, Jin J, Day T, Finke B and Bitton A. Risk stratification methods and provision of care management services in comprehensive primary care initiative practices. Ann Fam Med 2017; 15: 451-454.
[7] Takashima N, Arima H, Kita Y, Fujii T, Miyamatsu N, Komori M, Sugimoto Y, Nagata S, Miura K and Nozaki K. Incidence, management and short-term outcome of stroke in a general population of 1.4 million Japanese-Shiga Stroke Registry. Circ J 2017; 81: 1636-1646.
[8] Bednar DA. Description and results of a comprehensive care protocol for overnight-stay spine surgery in adults. Spine (Phila Pa 1976) 2017; 42: E871-E875.
[9] Castillo N, Malo M, Villacres N, Chauca J, Cornetero V, de Flores KR, Tapia R and Rios R. Methodology for estimating total direct costs of comprehensive care for non-communicable diseases. Rev Peru Med Exp Salud Publica 2017; 34: 119-125.
[10] Humaidan H, Yassi N, Weir L, Davis SM and Meretoja A. Airplane stroke syndrome. J Clin Neurosci 2016; 29: 77-80.
[11] Guzik A and Bushnell C. Stroke epidemiology and risk factor management. Continuum (Minneap Minn) 2017; 23: 15-39.
[12] Hopman P, de Bruin SR, Forjaz MJ, Rodriguez-Blazquez C, Tonnara G, Lemmens LC, Onder G, Baan CA and Rijken M. Effectiveness of comprehensive care programs for patients with multiple chronic conditions or frailty: a systematic literature review. Health Policy 2016; 120: 818-32.
[13] John S and Katzan I. Recurrent stroke while on antiplatelet therapy. Neurol Clin 2015; 33: 475-489.
[14] Cheah WK, Hor CP, Zariah AA and Looi I. A Review of stroke research in Malaysia from 2000-2014. Med J Malaysia 2016; 71: 58-69.
[15] Buzzi A, Kelley L, Gregory M, Skinner M and Kalnins W. Improving comprehensive care in the haemophilia community: building on the HERO study. Haemophilia 2016; 22: e320-2.
[16] Christensen H, Bentsen L and Christensen L. Update on specificities of stroke in women. Presse Med 2016; 45: e409-e418.
[17] Esenwa C and Gutierrez J. Secondary stroke prevention: challenges and solutions. Vasc Health Risk Manag 2015; 11: 437-50.
[18] Gomez-Batiste X, Mateo-Ortega D, Lasmarias C, Novellas A, Espinosa J, Beas E, Ela S and Barbero J; "LA CAIXA" FOUNDATION. Enhancing psychosocial and spiritual palliative care: four-year results of the program of comprehensive care for people with advanced illnesses and their families in Spain. Palliat Support Care 2017; 15: 98-109.
[19] Langer CS, Antonelli RC, Chamberlain L, Pan RJ and Keller D. Evolving federal and state health care policy: toward a more integrated and comprehensive care-delivery system for children with medical complexity. Pediatrics 2018; 141: S259-S265.
[20] Rafferty J; Committee on Psychosocial Aspects of Child and Family Health; Committee on Adolescence; Section on Lesbian, Gay, Bisexual, and Transgender Health and Wellness. Ensuring comprehensive care and support for transgender and gender-diverse children and adolescents. Pediatrics 2018; 142.
[21] Bulwa Z and Gupta A. Embolic stroke of undetermined source: the role of the nonstenotic carotid plaque. J Neurol Sci 2017; 382: 49-52.
[22] Tobase P, Mahajan A, Francis D, Leavitt AD and Giermasz A. A gap in comprehensive care: sexual health in men with haemophilia. Haemophilia 2017; 23: e389-e391.
[23] Wheatley L, Doyle W, Evans C, Gosse C and Smith K. Integrated comprehensive care-a case study in nursing leadership and system transformation. Nurs Leadersh (Tor Ont) 2017; 30: 33-42.
[24] Aledort LM. The evolution of comprehensive haemophilia care in the United States: perspectives from the frontline. Haemophilia 2016; 22: 676-83.
[25] Hahne K, Monnig G and Samol A. Atrial fibrillation and silent stroke: links, risks, and challenges. Vasc Health Risk Manag 2016; 12: 65-74.
[26] dos Santos AM and Giovanella L. Managing comprehensive care: a case study in a health district in Bahia State, Brazil. Cad Saude Publica 2016; 32: e00172214.
[27] Gunderman R. Hospitalists and the decline of comprehensive care. N Engl J Med 2016; 375: 1011-3.
[28] Delavaran H, Jonsson AC, Lovkvist H, Iwarsson S, Elmstahl S, Norrving B and Lindgren A. Cognitive function in stroke survivors: a 10-year follow-up study. Acta Neurol Scand 2017; 136: 187-194.